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ABSTRACT

A study was conducted to compare the effects of two types of word-attack correction procedures within the context of the "Decoding B" component of the S.R.A. corrective reading program and to evaluate the effectiveness of the program with remedial students. Ten teachers and 58 students (aged 7 to 14) were randomly assigned to one of two treatment conditions. Both treatments involved having the students read lists of words that the teacher had placed on the board. The only difference in the two treatments was the correction procedure employed when a student misidentified a word. The first treatment exemplified the diagnostic-prescriptive approach to correcting reading errors. In this condition, students were guided by the teacher through several steps that eventually combined the elements into words. After this process, the teacher then directed the students to the first word on the list and the entire list was read again. The second treatment simply had the teacher tell the group the correct word and then ask them to repeat it. The procedure was followed until the students read all of the words on the list correctly. Norm referenced, criterion referenced, and process measures were used to determine the effects of the two treatments. The results indicated that neither experimental treatment was more effective than the other. (FL)

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AN EXPERIMENTAL STUDY OF THE TREATMENT EFFECTS OF WORD-ANALYSIS AND WORD-SUPPLY CORRECTION PROCEDURES DURING WORD-ATTACK

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Introduction

Purpose

There were two reasons for conducting this study. The primary reason was to compare the effects of two types of word-attack correction procedures within the context of the carefully designed S.R.A. corrective Reading Program. The secondary reason for the study was to evaluate the program's effectiveness with remedial reading students. The Decoding B component of the S.R.A. Corrective Reading Program was selected as the program for study of this question for a variety of reasons. There is empirical evidence to support many of the procedures for teaching Decoding B (Becker, Engelmann, and Thomas, 1971, 1975; Kazdin, 1978; Lindsley, 1964, 1971). Further studies by Stallings (1978), Brophy and Evertson (1976), Good (1978), and Fisher et al. (1978) support the program's various aspects of direct instruction, feedback, allocated time, and emphasis on student engagement. What had not been done was to study one of the critical variables embodied in the program.

This may appear to be a fine-grained or miniscule aspect of teaching to study, but great controversy exists regarding how poor readers should be corrected. Much of the debate is theoretical -- there is little empirical evidence to support either position. The positions range from that of advocating a word-analysis correction each time a student makes an error (Otto, 1976), regardless of the context of the error, to advocating that whenever students make errors, they should simply be told the correct word (Goodman & Burke, 1973).

Previous studies have been of short duration. They have traditionally been conducted with materials that required a great deal of teacher judgement about how to present the lessons. Decoding B is carefully scripted so that the teacher is told what to say to the students during each part of the lesson. These materials provide an ideal opportunity for studying one variable during word-attack instruction.

Program Overview

The 1978 edition of Decoding B is a greatly revised version of the 1974 program. All of the teacher directions within the program with the exception of correction procedures for word-attack are simplified version of the 1974 edition.

The program involves scripted lessons of three parts for 160 instructional periods. The first part of the lesson is Word-Attack. The word-attack portion of the lesson is designed to teach new words and patterns. The students read lists of words that the teacher has printed on the board. It was during this part of the lesson that the change in procedures was made for half of the groups of students in the study. Five experimental groups were corrected during Word-Attack by the teacher simply telling them the correct word after an error was made. The students then repeated the word and practiced the list in which the word had occurred until they could correctly identify all of the words in the list. This was the Word-Supply treatment. The remaining five groups of students were corrected by their teachers with the Word-Analysis correction procedures specified in the program. These correction procedures required that the teacher determine what kind of word the word was (regular, irregular, word with an ending, or a word with no ending) and then present one of four

types of corrections on the basis of the word type. After the Word-Analysis correction was completed, the students then repeated the list of words in which the word that was missed had occurred. All other parts of the Word-Attack presentation were the same for both groups.

After the completion of word-attack, all groups then completed Group Story Reading. In this portion of the lesson, the students read stories that had been written for the program. Errors made by individuals during Group Story Reading were corrected with a Word-Supply correction for all groups. This is the procedure specified within the program. The third portion of the lesson for all groups was Individual Checkouts. All students read 100-word passages to a checker. The number of errors that the students made while reading independently was tallied by the checker.

Monitoring

Careful monitoring was accomplished during the period of time required to complete the study. Audio tapes were made of the teachers at frequent intervals. The tapes were then coded to determine if the teachers were performing the appropriate treatment. Also, teachers were compared on the rate of their presentation.

Additional data were gathered to determine if one group of students made more errors during word-attack than the other. It was felt that careful monitoring was necessary in order to determine whether or not the two treatments were being implemented as specified. The additional data collected on teaching techniques provided an opportunity to see if one group was receiving more practice because the words were presented at a faster rate.

Additional monitoring was accomplished by collecting data daily on the number of errors that each group made while reading the lesson's story. Students were also tested every 10 lessons on criterion-referenced word lists that were developed for the purpose of this study. This monitoring provided additional data for analysis between groups.

Hypotheses

It was hypothesized that there would be no significant posttest difference between groups in student achievement on the Placement Test, the Wide Range Achievement Test, or the Gray Oral Reading Test. No significant differences were hypothesized between groups on the number of teaching days for students receiving the Word-Analysis treatment for completing 70 lessons of Decoding B as compared to the number of teaching days that students receiving the Word-Supply treatment would require. No significant differences were hypothesized between groups on the number of errors made during word-attack on the four lessons of word-attack analyzed for the total number of students responses, the number of words misidentified, or the rate of the teaching presentation.

Both groups were hypothesized to show significant differences between pretest and posttest performance on the Wide Range Achievement Test using raw scores, the Gray Oral Reading Test using grade equivalent scores, and the Corrective Reading Placement Test using raw scores. A power measure was used to calculate educationally significant differences.

Applications

Common sense suggests that if simple procedures are found to be as effective as more complex procedures, those procedures have a better chance of being implemented. Experience in teacher training has already suggested that within the context of this program, a disproportionate amount of training time (9 out of 12 hours) had to be spent training the teachers to perform the Word-Analysis corrections. And, given the complexity of the correction procedures, there was little evidence to suggest that the procedures were implemented in the way that they were presented in the program.

Study of Correction Treatments

Independent Variable

The purpose of this study was to compare the effects of two methods of correction treatments during word-attack instruction. The correction procedure is the single independent variable. The two methods are Word-Analysis (guided practice during which the teacher determines if the word is regular, irregular, a vowel conversion word without an ending, or a vowel conversion word with an ending and then applies the appropriate correction) and Word-Supply (the teacher simply identifies the correct word and has the students repeat the list of words).

The first method exemplifies the diagnostic -- prescriptive approach to correcting reading errors. When this approach was used, the group was guided by the teacher through several steps that eventually combined the elements into words. After this process, the teacher then directed the students to the first word in that list and the entire list was read again. This process was followed until all of the words were read correctly.

The second method simply had the teacher tell the group the correct word, and ask them to repeat the word. This procedure was followed until the group read all of the words in the list correctly.

Both treatments involved the same lists of words and training to criterion on the list. The only difference in instruction was the correction procedure that the teacher employed when someone misidentified a word.

Subjects and Setting

Teachers. Ten teachers were randomly selected from the Special Education Department of a Southern California school district. All of the teachers hold Learning Handicapped credentials from the State of California. They were assigned to either Educationally Handicapped (EH) classes or Learning Disabilities (LD) classes.

The teachers varied in general teaching experience as well as in experience teaching Decoding Stratagies. Male and female teachers were included in the sample. Five of the teachers were randomly assigned to the Word-Analysis treatment, and the other five teachers were assigned to the Word-Supply treatment. Each teacher had her/his own classroom. Those teachers assigned to EH taught the same students all day in a self-contained setting. The teachers assigned to LD taught several groups of students for one-hour periods each day. Table 1 presents the demographic information for the ten teachers.

Table 1

Teachers -- Word Analysis Treatment

Teacher	Sex	Teaching Experience	Experience Teaching Corrective Reading	Assigned To	Training for Corrective Reading
1	F	4 years	2 years	LD	2 days
2	F	4 years	2 years	LD	2 days
3	M	0 months	0 months	EH	3 days
4	F	11 years	0 months	LD	2 days
5	F	2 years	1 year	EH	2 days
$\bar{x}$'s		37.8 months	9 months		2.2 days

Teachers -- Word Supply Treatment

6	F	1 year	0 months	LD	2 days
7	F	1 year	0 months	EH	2 days
8	F	4 years	2 months	EH	5 days
9	F	6 years	2 years	LD	3 days
10	M	2 years	0 months	EH	2 days
$\bar{x}$'s		25.2 months	4 months		2.8 days

All of the teachers attended a two-day district-sponsored training session for Decoding Strategies prior to the first day of school. The Word Analysis Correction procedures were presented and practiced during this workshop. At the conclusion of the workshop, the five teachers randomly assigned to the Word-Supply treatment were identified and a fifteen-minute meeting was held with them. At this meeting the teachers were told that the district was curious about the effectiveness of the Word-Analysis Correction procedures and had designed a study to determine the effects of a Word-Supply Correction procedure. They were told that they were to use

the Word-Supply Correction instead of the Word-Analysis Correction at all times. They were also instructed to make audio tapes of several word-attack presentations to the Word-Supply Correction. The teachers assigned to the Word-Analysis treatment also met and were instructed to audio tape specified lessons. The correction procedures used by both groups appear in Appendix A.

Students. Twenty-nine students were randomly selected and assigned to each of the two treatments. These students were selected from all special education students (LD and EH) in the district between fourth grade and seventh grade. The students ranged in age from 7.1 to 14.1 with a mean age of 11.2. The students ranged in IQ from 68 to 117 with a mean IQ of 89.6. All students were Title I eligible. Table 2 presents demographic information on the students.

Table 2

Teacher	Group Size	Males	Females	Ethnic Background Anglo	Other
Students -- Word Analysis Treatment					
1	5	5	0	2	3
2	4	2	2	1	3
3	7	5	2	4	3
4	7	5	2	5	2
5	6	4	2	3	2
Totals	29	21	8	15	13
Students -- Word Supply Treatment					
6	2	2	0	2	0
7	9	8	1	6	3
8	8	7	1	5	3
9	4	1	3	2	2
10	6	4	2	3	3
Totals	29	22	7	18	11

Their entry reading performance was between 2.4 and 5.7 on the Wide Range Achievement Test and 1.0 to 3.9 on the Gray Oral Reading Test. The highest performing student missed only four words on the Placement Test, while the lowest performing student missed 44 words. Appendix B provides the pretest scores for each student.

Design

This experimental study involved random selection and assignment of the 10 teachers and 58 students to 1 of 2 treatments. Half of the teachers were assigned to the Word-Analysis treatment condition and half of the teachers were assigned to the Word-Supply treatment condition. Students were assigned equally to each of the two treatments. All other facets of instruction were the same for the groups.

Group progress was measured by the number of errors in the daily stories. The teachers coded these story sheets to indicate which words had been misidentified during oral reading. On-going progress was determined by administering the Continuous Test designed for this study. These tests were word lists (10 words each) that represented words that had been taught during ten-lesson segments. These tests were administered by the teachers at the conclusion of each ten-lesson block. A copy of the instruction memo appears as Appendix C. The test is Appendix D.

While listening to the tapes of the Word-Attack presentations for lessons 4, 24, 42, and 60, the total number of responses, the number of words missed, and the type of correction procedure used were noted. The rate of the teaching presentation was calculated. These data appear as Appendix E. The tapes contributed to the careful monitoring of the treatments. They provide evidence that the treatments were fully implemented.

Materials

The S.R.A. Corrective Reading: Decoding Strategies (Engelmann et al., 1978) program was used as the instructional program. These materials carefully specify word-attack exercises that the teacher presents from the chalkboard, Story Reading exercises (from stories that were written for the program), and Individual Checkouts for each of 140 lessons. The lessons provide a script for the teacher and all of the student materials. A management system that specifies points for reading behavior as well as general behavior is an integral part of the program.

Each lesson is designed to take aproximately 45 minutes. The following three activities are allocated these approximate times:

1. Word attack: 10 minutes.
2. Story reading: 20 minutes.
3. Individual Checkouts: 15 minutes.

Dependent Measures

Norm-referenced, criterion-referenced, and process measures were used to determine the effects of the two correction treatments. Specifically, these measures were the Wide Range Achievement Test (1976) as a measure of decoding, the Gray Oral Reading Test (1967) as a measure of decoding and reading rate, and the Placement Test (1978) as an additional measure of decoding and reading rate.

The percentages of words missed in the day's story that had been taught in that lesson's word-attack presentation were determined for each group for 70 lessons. Comparisons were also made between the two groups on the number of words missed, the number of total responses, and the rate of the teaching presentation for lessons 6, 24, 42, and 60. The number of teaching periods required for each group to complete 70 lessons was also compared.

Analyses

A t test was performed on each of the three tests (the Wide Range Achievement Test, the Gray Oral Reading Test, and the Placement Test). Omega squared was calculated to determine the power of each of the two treatments. Additional information was gained by performing an analysis of covariance with subjects nested in classes and classes nested in treatments. For this analysis, IQ, age, ethnicity and pretest scores were used as covariates. A multiple regression analysis was also performed to determine the correlations of each of the covariates to the posttests.

An analysis of variance with repeated measures was performed on the percentage of words missed in the lesson's story that had been taught in word-attack. The analysis of variance repeated measures was performed after the 70 lessons had been collapsed into 10-lesson segments. A second analysis of variance repeated measures was completed on the group means of the seven criterion referenced tests that had been administered every ten lessons. A final t test was computed to compare the number of instructional periods that each group required to complete the 70 lessons.

Evaluation of Decoding B

The secondary purpose of this study was to compare the reading gains of the students in the sample to national norms on the Wide Range Achievement Test and the Gray Oral Reading Test. A correlated t test was performed on the pretest and posttest scores. Two additional t tests were performed on the pretest-posttest measures of reading rate on the Placement Test and the Gray Oral Reading Test.

Results and Discussion

Study of Correction Treatments

The major purpose of this experiment was to determine thether there were significant differences in oral reading performance for students taught the first 70 lessons of Decoding B with a Word Analysis correction procedure during word-attack and students taught with a Word-Supply correction procedure.

The three t tests performed on the posttest scores of the Wide Range Achievement Test (WRAT), the Placement Test, and the Gray Oral Reading Test. The analyses, revealed non-significant differences between the two treatment groups.

The analysis of covariance also showed non-significant differences between treatments. It also demonstrated that neither age, IQ, nor ethnicity predicted a student's posttest score. The multiple regression analysis showed the pretest-posttest correlations to be moderate for the WRAT, the Gray and the Placement Test.

The analysis of variance with repeated measures conducted on the percentage of words missed in the lesson's story that had been taught in word-attack for 7 10-lesson segments, and the analysis of variance repeated measures conducted on the 7 criterion-referenced tests also indicated non-significant differences in the number of instructional periods required to complete 70 lessons also yielded non-significant results.

Evaluation of Decoding B

The secondary purpose of this experiment was to test for statistically significant and educationally significant gains for all subjects on the WRAT, the Gray, and the Placement Test in decoding and the Placement Test in reading rate (words per minute).

The next section of this paper presents the detailed results of the experiment. Actual significance levels are reported. The Omega Squared (ω^2) index was computed to determine the strength of the effect of the treatment. The results are discussed with greater emphasis on the educational and practical significance of the experiment and the evaluation of Decoding B than on the statistical significance of the analyses.

Results

Study of Correction Treatments

Main Analysis. The main analysis was performed on the posttest scores of the WRAT, the Gray, and the Placement Test. Table 3 provides the means, standard deviations and number of groups for each treatment.

A t test was computed on each of the posttest scores. Table 4 provides the t values and degrees of freedom for each of the three analyses.

Table 3
Means ($\bar{x}$) and Standard Deviations (SD) on Posttest Wide Range Achievement Test, Gray Oral Reading Test, and the Placement Test

	Word-Analysis Approach (N=5)				Word-Supply Approach (N=5)			
	Pretest		Posttest		Pretest		Posttest	
Test	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD
WRAT Raw Scores	26.72	1.43	29.41	1.94	27.12	1.18	30.73	1.44
Gray Grade Equivalents	1.98	0.12	2.79	0.57	2.46	0.63	3.09	0.71
Placement Number of Errors	17.00	5.51	6.53	1.86	18.90	3.47	7.86	4.19

Table 4
Summary of t Tests for Posttest Scores on the Wide Range Achievement Test, the Gray Oral, and the Placement Test

Test	df	$\bar{x}$	SD	t	p	ω^2
WRAT	8	30.22	3.96	.859	>.05	.092
Gray Oral	8	2.94	7.97	.754	>.05	.071
Placement	8	7.05	4.92	.643	>.05	.051

Table 5
Summary of t Tests for Posttest Scores of Reading Rate (Words per Minute) on the Placement Test and the Gray Oral

Test	df	$\bar{x}$	SD	t	p
Post Placement	8	61.18	15.55	.522	>.05
Post Gray Oral	8	59.16	8.46	.340	>.05

A t test was computed for reading rate on the posttest scores of both the Placement Test and the Gray. A summary of those scores appears in Table 5.

Secondary Analyses. In order to increase the power of the analysis, an analysis of covariance was also performed using a completely nested design with students nested in classes and classes nested in treatments. The pretest scores on the WRAT, the Gray, and Placement Test as well as age, IQ and ethnicity were entered as covariates. In this analysis, again no significant differences were found. No covariate explained a significant amount of posttest variance. It was found that more of the variance was explained by the pretest scores on the WRAT than by any of the other covariates. Neither IQ, chronological age, nor ethnicity showed significant posttest correlations.

The means and standard deviations for pretest and posttest scores, age, IQ, and ethnicity are reported in Table 6.

Table 6
Descriptive Statistics for
Total Sample (N = 58)

Variable	$\bar{X}$	SD
Treatment	.55	.50
Class	3.13	1.32
Pre-WRAT	27.1	2.56
Pre-Placement	17.40	7.40
Pre-Gray	2.21	.65
Post-WRAT	30.22	3.96
Post-Placement	7.05	4.92
Post-Gray	2.94	.79
CA	11.12	1.42
IQ	89.55	12.11
Percent Non Anglo	.38	.49

A correlational analysis was completed in order to determine the relationship between the three measures used for the pretests and posttests. This analysis revealed that the pretest-posttest correlations were in the moderate range (range of r = 's .40 to .57, see Table 7). Futhermore, this analysis showed weak relationships between chronological age, intelligence, ethnicity, and posttest performance. The posttest scores on the WRAT were best explained by the pretest WRAT scores. The posttest Placement Test scores were explained by the pretest WRAT scores and Placement Test scores, but not type of treatment. The posttest scores on the Gray Oral correlated moderately (r = 's approximately .6) with the pretest Gray scores, but had very low correlations with the other two pretest measures (r = 's approximately .15).

Table 7 summarizes the correlations of the pretest and posttest measures as well as the correlations of each measure to each of the other measures.

The two analyses of variance with repeated measures were computed to determine whether differences between treatements existed on the percentage of words missed in the lessons's story that had been taught in word-attack, or on the seven criterion-referenced tests. Significant differences were not found between groups on the words missed in the story or on the continuous tests. Table 8 summarizes the results of the two analyses of variance.

Table 7
Summary of Pretest-Posttest Chronological Age, I.Q., and Ethnicity Correlations

	Pre-WRAT	Pre-Placement	Pre-Gray	Post-WRAT	Post-Placement	Post-Gray	CA	IQ	Ethnicity
Pre-WRAT	---	-.43	.33	.54	-.44	.13	-.18	.11	-.17
Pre-Placement	-.43	---	-.30	-.28	.40	-.19	.28	.12	-.07
Pre-Gray	.33	-.30	---	.24	-.23	.57	-.16	.00	-.07
Post-WRAT	.54	-.27	.24	---	-.48	.28	-.12	.24	-.11
Post-Placement	-.43	.40	-.22	-.48	---	-.07	.15	-.10	.17
Post-Gray	.13	-.19	.57	.28	-.07	---	-.10	-.16	.11
CA	-.18	.28	-.16	-.12	.15	-.10	---	-.16	-.03
IQ	.11	.11	.00	.24	-.10	-.16	-.16	---	-.20
Ethnicity	-.1[illegible]	-.07	-.08	-.12	.17	.11	-.03	-.20	---

Table 8
Summary of Analysis of Variance with Repeated Measures on Percentage of Word-Attack Words Missed in Daily Stories and Words Missed on Continuous Tests

Analysis	df	$\bar{x}$	SD	Mean Square	F	p
Percentage Word-Attack Words Missed **	1	.54	.15	.25	2.90	.12
Criterion-Referenced Test Scores *	1	1.07	.56	.01	0.01	.93

*Maximum score on each test was 10.
**Arcsin transformations were used in this analysis.

The final analysis investigating differences in the effects of the two treatments involved counting the number of instructional periods that each group required to complete the 70 lessons. Table 9 summarizes the total number of lessons for each group, and gives the means and standard deviations. No significant difference was found; $t_{(8)} = 1.40$.

Table 9
Instructional Periods for Teaching 70 Lessons for each Group. Means, Standard Deviations, and Summary of t Test Results

Group	Periods	Treatment	$\bar{X}$	SD	df	t	p
1	72	W-Analysis					
2	71	W-Analysis					
3	72	W-Analysis					
4	75	W-Analysis					
5	71	W-Analysis					
			72.2	1.28			
6	71	W-Supply					
7	79	W-Supply					
8	77	W-Supply					
9	76	W-Supply					
10	76	W-Supply					
			75.8	2.64			
					1	1.40	.20

Evaluation of Decoding B

The analysis performed on the pretest-posttest scores of the WRAT, the Gray, and the Placement Test showed statistically significant gains on all three measures in decoding with correlated two-tailed t tests using a completely nested design. Table 10 provides means, standard deviations, and the significance tests.

Table 10
Summary of t Tests
of Pretest-Posttest measures

Test	$\bar{x}$	SD	df	t	p
Pre-WRAT	27.10	2.56	57	7.12	<.001
Post-WRAT	30.22	3.96			
Pre-Gray	2.217	.650	57	8.04	<.001
Post-Gray	2.943	.798			
Pre-Placement Errors	17.40	7.40	57	11.12	<.001
Post-Placement Errors	7.05	4.91			

These gains were highly statistically significant, and were then considered in terms of their educational significance (Becker & Engelmann, 1976). For the WRAT, the pooled standard deviation across treatments was found to be 3.96. The mean differences between pretest and posttest were calculated, the difference in standard deviation units was found to be .78. When similar procedures were followed with the Gray (pooled SD = 7.98), the difference was calculated to be .92 standard deviation units. The difference on the Placement Test (pooled SD = 4.92) was 2.1 standard deviation units. Using Becker and Engelmann's (1976) criterion of a difference of .5 pooled standard deviation units, the Stebbins et al. (1977) criterion of .25 pooled standard deviation units, or the Horst, Tallmadge, and Wood's (1975) criterion of .33 units, it is apparent that all of these differences are highly educationally significant.

Correlated t tests also yielded significant gains for the pretest-posttest scores of reading rate (words read per minute) on the Placement Test $t_8 = 3.99$, but non-significant gains for reading rate on the Gray $t_{(8)} = .29$, n.s.

Discussion

Introduction

The analyses obtained on the main dependent measures (the Wide Range Achievement Test, the Gray Oral Reading Test, and the Placement Test) indicated that neither experimental treatment was more effective than the other. No statistical differences were found between groups taught word-attack using the Word-Analysis Correction procedures and groups taught word-attack using the Word-Supply correction procedure.

In addition, no statistical differences in reading rate were found on either the Gray Oral Reading Test or the Placement Test, the percentage of word-attack words missed in the daily stories, or words missed on the continuous tests.

Before discussing the relevance of these findings, it is important to reiterate the likely importance of the variables that remained constant for both groups. Both groups were taught Decoding B using the prescribed word-attack practices, with the exception of the variation in correction procedures, for 70 lessons. These exercises emphasized a great deal of practice that included word-attack analysis training on new words and word families. In addition, both groups were taught the daily stories, including corrections that were word-supply corrections. The word-supply

corrections were constant for both groups during story-reading and individual checkouts. Therefore, the relevance of the findings of this study is limited to teaching decoding to poor readers using S.R.A. Decoding B. It would be inappropriate to generalize the findings to either other populations of students, similar students who are taught using other materials, or other types of teaching presentations.

Study of Correction Treatments

Main Analysis. Statistically significant differences were not found between groups on any of the dependent measures. The calculation of Omega Squared for each dependent measure was less than .01. Thus, the magnitude of the treatment effect was extremely small. These data support the contention that the strength of the other programmatic and teaching variables will maintain an implementation that allows for a simplified correction of word-attack errors with Decoding B. No differences were found between groups in decoding on the Wide Range Achievement Test, the Gray Oral Reading Test, or the Placement Test. In addition, no differences found between groups in reading rate on either the Placement Test or the Gray Oral Reading Test. Furthermore, the study does not imply that it is unnecessary to teach word-attack skills, but only that in the context of Decoding B word-attack instruction, this more complicated procedure appears to be unnecessary.

Secondary Analyses. The mean pretest score of the Word-Analysis groups was approximately .25 raw score points higher than the Word-Supply groups on the Wide Range Achievement Test (27.21) and approximately four months higher (using grade equivalents) on the Gray Oral Reading Test (2.4). These higher pretest scores justified computing an analysis of covariance, despite the random assignment.

The analysis of covariance was completed with the three pretest scores, IQ, age, and ethnicity entered as covariates in the completely nested design (subjects nested in classes, classes nested in treatments). This analysis determined that most of the variance in scores was explained by the pretest scores on the Wide Range Achievement Test. A little variance was explained by age, ethnicity, or the other pretest scores when the WRAT posttest was the dependent variable, some of the variance was explained by the pretest scores on the Placement Test and the WRAT. The variance in the posttest scors on the Gray Oral Reading Test was explained primarily by the Gray pretest. Therefore, it is interesting that even though the age of the students in the sample ranged up to 7 years (7.1 to 14.1), and they had a standard deviation in IQ of over 12 points, neither age nor IQ explained their posttest scores.

The multiple regression analysis demonstrated that the measures were not highly correlated pretest to posttest. The correlations were approximately .4 to .5, and age, intelligence, and ethnicity predicted nothing. The highest pretest-posttest correlations were with the WRAT and the Gray.

The means and standard deviations produced by the analysis of variance repeated measures on the Continuous Tests showed that the Word-Analysis groups had non-significant, but slightly higher mean errors on 4 of the 7 tests. However, the differences are so slight that no interpretation of a trend is warranted. The restricted range of these tests (each test was only ten words, and each word counted as one point) makes them more suspect to interpretation.

The analysis of variance with repeated measures performed on the percentage of words missed in the lesson's story that had been taught in word-attack produced very similar results. The means on the ten-lesson segments were fractionally higher for the Word-Analysis group on 4 of the 7 and the standard deviations were larger on 5 of the 7 segments. Both of these criterion-referenced analyses demonstrate the equality in the performance of the groups in the two treatments.

The final analysis for difference between the two treatment groups involved the number of instructional periods that the groups required to complete the 70 lessons. Error limits are established for each lesson's story-reading. Groups that exceed the error limit are required to repeat a story. Therefore, groups making high numbers of errors (the average limit is 12) would require more instructional periods to complete the 70 lessons. The Word-Analysis group had a range of 71-75 periods, and a mean of 72.2 periods, while the Word-Supply groups ranged from 71-79 lessons with a mean of 75.8 lessons. The standard deviation was slightly greater for the Word-Supply groups, and the difference between groups was not significant.

Thus, on every analysis, consistent non-significant differences were shown between groups. These analyses involved criterion-referenced and norm-referenced pretest and posttest dependent measures, daily and bi-weekly criterion-referenced measures, and an analysis of the length of time required by the groups in each treatment to complete the 70 lessons.

Evaluation of Decoding B

There are no clear guidelines for evaluating remedial students. Controversy exists regarding whether students should be tested at or below grade level (Ozenne, 1979; Roffeld, 1979; Temp, 1979). There is virtually no agreement about how to achieve accurate norm-referenced scores for students who are reading substantially below grade level. WRAT raw scores were used instead of grade equivalent scores, since the grade equivalent scores tend to have little meaning for low performers. Snow (1979) has suggested that whatever gains are statistically significant are "acceptable," but agreement does not exist as to whether or not a month's instruction will keep pace with time in school, but it will not allow students to "catch up."

The evaluation of Decoding B involved the selection of two norm-referenced tests of decoding (the WRAT, and the Gray) and a criterion-referenced test of decoding and reading rate (the Placement Test). The Gray was also analyzed for reading rate. All of these tests are administered orally, and each decoding error is recorded. This precision is similar to the procedures used in Decoding B, and therefore these tests were deemed appropriate for the evaluation of the program.

The analyses using correlated t tests for determining the statistical significance of the gains on all three dependent measures showed highly significant results in decoding on the WRAT, the Gray, and the Placement Test. In addition, if one uses either Becker and Engelmann's (1976) criterion of a difference of .5 pooled standard deviation units, the Stebbins et al. (1977) criterion of .25 pooled standard deviation units, or Horst, Tallmadge, and Wood's (1975) criterion of .33 units to identify

educational significance, educationally significant gains are made on all three measures. The mean gain on the Gray was 7 months, or greater than 1 month's gain for every month of instruction. The error reduction on the Placement Test was from a mean pretest score of 17.4 words missed to a posttest score of only 7.1 words missed.

The statistically significant gains in reading rate on the Placement Test and not on the Gray are probably a function of the fact that while both pretest and posttest passages are the same on the Placement Test, the Gray is designed so that the number of errors and reading rate determine which passages the students read. On the Gray, the passages are of increasing difficulty. Therefore, the students read harder passages for their posttests, and understandably read them more slowly.

The statistically and educationally significant gains in decoding on all three dependent measures and statistically significant gains in reading rate on the Placement Test attest to the effectiveness of Decoding B.

General Considerations and Implications for Education

Analyses of data collected during this experiment support the conclusion that Direct Instruction approach is effective for teaching decoding to intermediate and upper grade students, using the Decoding B program. It appears that the strength of the program is such that it is possible to correct errors during word-attack lessons by simply telling the students the word and achieve equally successful results as with using the Word-Analysis correction procedures prescribed in the program.

Currently, approximately 70% of allocated training time is spent practicing the Word-Analysis correction procedures (Haddox, 1979; Meyer, 1979). It has previously been impossible to practice story-reading and individual check-out procedures adequately because of the disproportionate amount of time required to practice the Word-Analysis correction procedures. This experiment has demonstrated the Word-Supply procedures to be equally effective. Training time can now be reallocated to provide practice on the other parts of the lesson which are presumed to be equally important.

Equally effective procedures that are simpler to use will permit more persons to implement the program successfully. They will ultimately result in more students being taught more effectively.

These data suggest that both Word-Analysis procedures and Word-Supply procedures may be appropriate strategies for teaching poor readers. In the Decoding B approach, Word-Analysis techniques are used to introduce new words and word families. Word-Supply procedures appear to be effective for correcting word-attack, story-reading, and individual check-out errors. Thus, the skills and drills (Otto, 1976) versus whole-word (Goodman & Burke, 1973) controversy may be determined a draw with each approach appropriate for certain situations (or stages of instruction) given a carefully designed set of materials taught with direct instruction techniques.

Limitations and Future Directions

The major limitations have been discussed previously. First, the findings should not be generalized to programs other than Decoding B. It is questionable if the same results would be achieved with other materials. Second, the students in the study were all special education students identified as educationally handicapped, or learning disabled. Therefore, one cannot be certain that comparable results would be obtained with other types of students. Third, the teachers were closely monitored by school psychologists and the experimenter. This monitoring was completed to insure that the treatments were implemented correctly. This high degree of monitoring is unusual, and one cannot be certain of the effect that this attention had on the teachers. Fourth, all of the teachers knew that they were in a "study," and it is possible that they were particularly conscientious.

This study was concerned with the effects of Word-Analysis versus Word-Supply procedures within an explicit context. The issue is important for training and implementation within this context. However, more general questions can be asked about various correction procedures, in relation to steps in skill development. For example, would students who have no analysis skills progress as quickly as students who have developed these skills? Is the null finding an interaction between the step of skill acquisition and the stage of learning? This is not a simple question to answer. It will be necessary to design studies that examine developmental

and remedial reading minutely. Furthermore, might the need for additional word-analysis practice be greater for students who make 30-40 errors on the Placement Test? How would these high-error students fare if taught Word-Analysis or Word-Supply corrections exclusively?

APPENDIX A

Correction Procedures

Word Supply Correction

1. Immediately say the correct word.
2. Ask the students, "What word?"
3. Return to the beginning of the word list in which the mistake had occurred.
4. Repeat the list until all words are identified correctly.

Word Analysis Corrections

- Mistakes on regularly spelled words without endings. Follow these steps to correct this type of mistake -- calling mat "meat," "mad," "at," or "man."

  1. Immediately say the correct word.
  2. Point to each misidentified letter and ask What sound?
  3. Say Sound it out with me. Touch under each letter or sound combination as you and the students say the sounds. Do not pause between sounds. (Repeat sounding out until all students are responding with you.)
  4. Point to the beginning of the word and ask What word?
  5. Change the word into the word that students mistakenly called it. Point to the beginning of the word and ask What word now? (If you have heard more than one incorrect word given as a response, pick any of the words for this step.)
  6. Change the word back into the original word. Point to the beginning of the word and ask What word now?

- For example, students identify the word lip as "lab."

  1. Lip. The word is lip.

2. Point to i. What sound? Point to p. What sound?

3. Sound it out with me. Touch under l, i, p, as you and the students say "llliiip" without pausing between sounds.

4. Point to the beginning of lip and ask What word?

5. Change lip into lab by erasing the last two letters and replacing them with a and b. Point to the beginning of lab and ask What word now?

6. Change lab back into lip. Point to the beginning and ask What word now?

- Same-vowel mistakes on words with endings. Follow these steps to correct this type of error -- calling robber "roper," calling taped "tapped," calling riding "ridding."

1. Immediately say the word correctly.

2. Point to the beginning of the word and ask What word?

3. Underline the word from the beginning to the second letter after the misidentified vowel. For example: ripper, robing, stopped, slider, dimming, stammer, griped.

Word Analysis Corrections

4. Ask Is the last letter of the underlined part e or i? . . . So are you going to hear a letter name?

5. Point to the beginning of the word. Ask What word?

6. Change the word into the word that students mistakenly called it. Point to the beginning of the word and ask What word now?

7. Change the word back to the original word. Point to the beginning of the word and ask What word now?

- Firming. After you have corrected a word, return to the first word in the column and present all the words in that column. This part of the correction is very important. It assures that students remember the correct word. If the students can remember the correct word after repeating the words in the column, they probably will remember it later. So always retest by returning to the first word in the column and presenting all the words in order.

Word Analysis Corrections

- Mistakes on irregular words and words with endings. The procedures for correcting irregular words (said, was, of, to, some) and words with endings (going, clapped, digger) is similar to the correction for regularly spelled words except that you don't sound out the word. Follow these steps.

  1. Immediately say the word correctly.

  2. Point to the beginning of the word and ask What word?

  3. Change the word into the word the students mistakenly called it. Point to the beginning of the word and ask What word now?

  4. Change the word back into the original word. Point to the beginning of the word and ask What word now?

  If students make the mistake of not responding at all, simply drop steps 3 and 4 from the correction.

- Same-vowel mistakes on words without endings. Same-vowel errors make up a special class of corrections. Students learn that if a word ends in the letter e, you hear a letter name in the word. A later variation of this rule applies to words with endings, such as pined or pining. If

the last letter of the underlined part is e, or i, you hear a letter name.

Note that steps 4 and 5 require students to discriminate between the original word and the word they mistakenly called it. These steps are the last part in all corrections.

- Follow these steps to correct this type of error -- calling mat "mate," calling robe "rob," calling slime "slim."

1. Immediately say the word correctly.

2. Point to the last letter of the word. Is the last letter e? . . . So are you going to hear a letter name?

3. Point to the beginning of the word and ask What word?

4. Change the word into the word the students mistakenly called it. Point to the beginning of the word and ask What word now?

5. Change the word back to the original word. Point to the beginning of the word and ask What word now?

APPENDIX B

Table 11
Pretest/Post Scores and Demographic Data

	Student	WRAT Pre/Post	Placement Pre/Post	Gray Pre/Post	CA	IQ	Anglo/Non (0)	Anglo/Non (1)	EH/LD (0)	EH/LD (1)
Group 1	IC	28/30	21/13	1.7/2.7	14.1	78		1		1
	FW	27/29	23/10	1.7/2.9	13.9	93	0			1
	HR	26/27	23/14	2.0/2.7	12.0	71		1		1
	LW	23/32	23/15	2.3/2.9	13.8	83	0			1
	RP	22/28	24/15	1.5/2.8	13.1	78		1		1
Group 2	RI	25/28	19/7	3.0/4.4	10.5	69	0			1
	LM	26/33	24/11	3.9/4.5	11.1	117	0			1
	FC	29/30	12/8	3.7/3.8	9.2	96		1		1
	SK	29/31	26/9	3.5/3.9	11.8	88	0			1
Group 3	PG	26/29	16/12	1.5/3.6	12.8	81		1	0	
	NC	29/29	9/19	2.4/3.5	7.4	72		1	0	
	DK	25/25	30/12	1.4/2.5	12.8	74	0		0	
	JM	29/33	11/6	3.5/4.8	10.1	80	0		0	
	MV	30/32	6/1	2.7/4.8	11.2	68		1	0	
	SA	28/28	30/10	1.8/2.5	8.3	111	0		0	
	TD	27/29	21/7	2.6/2.7	11.6	89	0		0	
Group 4	JN	27/29	17/1	2.8/2.8	10.6	74		1		1
	CA	24/28	28/7	1.7/1.9	11.4	87	0			1
	BA	27/34	26/3	1.8/2.0	10.1	97	0			1
	WB	33/38	9/0	3.5/4.8	11.0	92	0			1
	LC	26/32	13/3	2.2/2.3	11.9	94	0			1
	TM	26/35	27/4	2.0/2.2	11.7	91	0			1
	TR	26/32	22/10	2.7/2.6	11.8	86		1		1
Group 5	TM	24/26	14/4	1.6/2.3	8.8	84	0		0	
	MV	29/33	22/6	1.6/2.7	10.3	102	0		0	
	CS	27/34	16/2	2.3/2.9	11.2	83	0		0	
	RS	28/32	8/2	2.5/2.2	10.7	102	0		0	
	CB	32/31	8/3	3.9/2.4	10.2	94	0		0	
	GM	29/35	14/3	2.0/2.0	10.1	111		1	0	

Table 11 (continued)
Pretest/Post Scores and Demographic Data

	Student	Pre/Post	Pre/Post	Pre/Post	CA	IQ	Anglo/Non (0)	Anglo/Non (1)	EH/LD (0)	EH/LD (1)
Group 6	RK	25/27	19/7	2.6/2.5	11.3	96	0			1
	JH	27/32	10/3	1.0/2.2	10.0	97	0			1
	JN	25/27	17/6	1.5/2.5	12.0	87	1		0	
	JA	31/32	5/4	1.9/2.8	11.9	81	0		0	
	SB	26/27	15/4	2.2/2.1	11.9	74	0		0	
Group 7	LC	29/31	6/6	1.9/2.8	11.4	92	0		0	
	SI	32/49	12/1	2.1/3.6	10.3	92	0		0	
	CT	29/31	16/3	2.1/3.8	10.4	93	0		0	
	AP	27/32	16/5	1.9/2.8	11.5	92	1		0	
	TT	28/29	19/7	2.0/2.0	12.5	102	0		0	
	RV	29/32	6/4	1.9/2.8	9.4	86	1		0	
	DP	26/25	15/5	2.3/3.0	12.0	82	0		0	
	CM	24/27	13/17	1.6/2.3	11.2	101	0		0	
	RW	24/27	24/4	2.0/3.8	10.1	85	0		0	
Group 8	RC	28/32	12/4	2.6/3.4	8.1	82	1		0	
	SA	22/25	24/17	1.6/3.4	8.1	107	1		0	
	JF	27/33	16/4	2.1/2.9	11.1	110	1		0	
	DM	25/29	4/6	3.0/3.9	11.1	84	1		0	
	TP	24/32	12/3	2.2/3.6	10.5	76	1		0	
	DW	25/28	22/14	2.4/3.8	12.5	95	0			1
Group 9	MH	30/36	19/0	2.5/3.6	12.1	116	0			1
	GR	26/31	21/0	2.5/3.8	13.0	90	1			1
	LT	25/24	44/13	1.1/2.5	12.0	92	1			1
	JC	29/26	14/3	2.0/1.9	11.5	101	1		0	
	MD	28/27	19/7	2.1/2.0	11.1	89	0		0	
Group 10	MG	25/27	15/9	2.0/2.1	10.1	112	0		0	
	AV	28/27	19/9	2.0/2.1	10.7	72	0		0	
	LV	26/27	18/17	2.0/2.5	12.9	81	1		0	
	CW	28/27	15/9	2.0/2.1	11.2	82	0		0	

APPENDIX C

Continuous Test Memo

To All Teachers using Level B Decoding

From: Linda Meyer

Date: September 28, 1978

Re: Continuous Tests for Level Decoding

Attached are the copies of word lists to be used as Continuous Tests for Level B Decoding as we discussed briefly in the training session. The lists are to be used in the following way:

1. Administer the list on the Lesson day that is indicated. If you are beyond Lesson 10, administer the words for Lesson 10 as soon as you can.

2. Administer the words during the individual checkout for the lesson.

3. Checker marks the student's copy. Student reads from a clean copy.

4. Checker circles any word that is missed by the student on the student's copy of the list.

5. Keep the student copy so that it can be used each ten lessons.

6. Ignore the asterisks -- they just designate irregular words.

More lists will follow for Lessons 90-140.

Good luck.

APPENDIX D

Continuous Test

Lesson 10				
dressed	them	spotting	was*	pit
robbers	streets	pong	stand	to*
Lesson 20				
then	know*	croak	from*	moped
form	smeared	mopped	wow	rate
Lesson 30				
clamp	someone*	camming	reached	fretting
prop	cape	woman*	shed	conned
Lesson 40				
fastest	what*	nothing*	bade	stealing
workers	slatter	taped	sham	slate
Lesson 50				
cam	swim	beaten	who*	become
sneeze	clipper	paint	meat	waited
Lesson 60				
pike	shifting	covered*	heap	done*
smashed	bits	dragged	gripe	gripping
Lesson 70				
rubbed	hard	beads	want*	already*
wife	dusty	firing	smart	think
Lesson 80				
sound	coach	bright	guy*	friend*
started	stinker	hous	striped	sight

APPENDIX E

Teaching Data

The teachers made tapes of the word-attack portions of the lessons 6, 24, 42, and 60. These tapes were analyzed for:

1. Total responses made by the students
2. Total errors made during word-attack
3. Rate of responses (number of responses per minute)

The teachers were given feedback on these three variables after the experimenter listened to each tape. The teaching presentations were also coded to determine if the teachers corrected with the correction procedures appropriate for his or her treatment. All teachers were performing the appropriate corrections on the taped lessons.

The raw data for each teacher follows in Table 12 on pages 111 and 112.

Table 12
Teaching Data
Word-Analysis Treatment

Teacher - Tape		Total Responses	Total Errors	Rate
Teacher 1	6	164	3	13.6/Min.
	24	184	9	15.3/Min.
	42	200	12	20.0/Min.
	60	149	14	21.2/Min.
$\bar{x}$'s		174.25	9.5	17.5/Min.
Teacher 2	6	131	2	18.7/Min.
	24	150	3	25.0/Min.
	42	209	6	29.8/Min.
	60	156	2	26.0/Min.
$\bar{x}$'s		161.5	3.25	24.8/Min.
Teacher 3	6	183	9	12.2/Min.
	24	250	15	22.7/Min.
	42	154	5	18.2/Min.
	60	152	4	19.0/Min.
$\bar{x}$'s		184.7	8.25	18.0/Min.
Teacher 4	6	97	3	12.1/Min.
	24	159	3	14.4/Min.
	42	80	2	13.3/Min.
	60	70	2	11.6/Min.
$\bar{x}$'s		101.5	2.5	12.8/Min.
Teacher 5	6	199	5	15.3/Min.
	24	241	10	17.2/Min.
	42	110	6	12.2/Min.
	60	110	4	15.7/Min.
$\bar{x}$'s		165.0	6.25	15.1/Min.

Table 12 (continued)
Teaching Data
Word-Supply Treatment

Teacher - Tape		Total Responses	Total Errors	Rate
Teacher 6	6	185	9	23.0/Min.
	24	235	8	23.5/Min.
	42	136	3	13.6/Min.
	60	102	1	10.2/Min.
$\bar{x}$'s		164.5	5.25	17.5/Min.
Teacher 7	6	134	6	13.4/Min.
	24	209	9	11.6/Min.
	42	116	3	16.5/Min.
	60	132	2	18.8/Min.
$\bar{x}$'s		147.75	5	15.0/Min.
Teacher 8	6	359	3	22.4/Min.
	24	393	2	32.7/Min.
	42	220	2	22.0/Min.
	60	114	3	19.0/Min.
$\bar{x}$'s		272.5	2.5	24.0/Min.
Teacher 9	6	96	2	24.0/Min.
	24	106	7	15.1/Min.
	42	100	6	33.3/Min.
	60	117	3	23.4/Min.
$\bar{x}$'s		104.7	4.5	23.9/Min.
Teacher 10	6	172	7	17.2/Min.
	24	265	6	33.1/Min.
	42	147	4	18.3/Min.
	60	223	5	14.8/Min.
$\bar{x}$'s		201.7	5.5	20.8/Min.

Analysis

An analysis of variance with repeated measures was calculated on these data, using total responses, errors, and rate as dependent measures. These analyses showed no significant differences between teachers.

Differences were apparent between tapes and some classes did better within each treatment. There were some changes over time as the groups progressed from lesson 6 (the first tape) through lesson 60 (the final tape). Table 13 presents the data.

Table 13
Data for Word-Attack
Lessons 6, 24, 42, 60
Measuring Total Responses, Errors,
and Rate of Presentation

Variable	df	Mean Square	F	p
Total Responses	1	430.40	0.18	.676
Errors	1	9.54	1.45	.241
Rate	1	3374.39	1.20	.286

These data substantiate that there were no significant differences between groups, and this is an important consideration for this experiment. The equality of the reaching allows one to have greater confidence in the findings.

The number of total responses ($\bar{x}$ = 167.8) is outstanding, the average number of errors ($\bar{x}$ = 5.3) is very good, and the response rate ($\bar{x}$ = 19 responses per minute) is almost one response every three seconds. These data represent consistently superior implementation.

Bibliography

Becker, W. C. & Engelmann, S. E. Teaching 3: Evaluation of instruction. Chicago: Science Research Associates, 1976.

Becker, W. C., Engelmann, S. E., & Thomas, D. R. Teaching 2: Cognitive learning and instruction. Chicago: Science Research Associates, 1975.

Becker, W. C. & Engelmann, S. E. Teaching 3: Evaluation of instruction. Chicago: Science Research Associates, 1976.

Bock, G., Stebbins, L. B. & Proper, E. C. Education as experimentation: A planned variation model. Boston: Abt Associates, 1977.

Brophy, J. E. & Evertson, C. M. Learning from teaching. Boston: Allyn and Bacon, 1976.

Engelmann, S. E., Johnson, G. L., Becker, W. C., Meyers, L. A., Carnine, L. M. & Becker, J. Corrective reading: Decoding strategies. Chicago: Science Research Associates, Inc., 1978.

Fisher, C. W., Berliner, D. C., Filby, N. N., Marliave, R., Cahen, L. S., Dishaw, M. M., & Moore, J. E. Teaching and learning in the elementary school: A summary of the beginning teacher evaluation study. Report VII-1, Far West Laboratory, San Francisco, 1978.

Good, T. L. The Missouri mathematics effectiveness project: A program of naturalistic and experimental research. Paper presented at the annual meeting of the American Educational Research Association, 1978.

Goodman, K. S. & Burke, C. Theoretically based studies of patterns of miscues in oral reading performance. Final report, Project No. 9-0375, Grant No. OEG-0-9-320375-4269, U. S. Department of Health, Education & Welfare, 1973.

Gary, W. S. Gary oral reading tests. New York: Bobbs Merrill, 1967.

Haddox, P. Training schedules, 1979.

Horst, D. P., Tallmadge, G. K., & Wood, C. T. Measuring achievement gains in educational projects. R.M.C. Research Corporation, Los Altos, California, 1974.

Jastak, J. F. & Jastak, S. R. Wide range achievement test. Wilmington, Del.: Guidance Associates, 1976.

Kazdin, A. E. History of behavior modification: Experimental foundations of contemporary research. Baltimore, Md.: University Park Press, 1978.

Lindsley, O. R. Precise behavioral management system. In M. C. Reynolds (Ed.), Proceedings of the conference on psychology and the process of schooling in the next decade. Minneapolis, Minn.: University of Minnesota, 1971.

Meyer, L. A. Clinical observations, 1979.

Otto, W. Controversies in reading instruction. Paper presented at the International Reading Association Regional Seminar. Sea-Tac Motor Inn, Seattle, Washinton, March 1976.

Ozenne, D. You many not get what you think you are getting: What test scores mean in out-of-level testing. Paper presented to the American Education Research Association. San Francisco: April 1979.

Raffeld, P. Out-of-level testing does not hold up to what it promises. Paper presented to the American Educational Research Association, San Francisco, April 1979.

Snow, R. E. Personal communication, 1979.

Stallings, J. A. Teaching basic reading skills in secondary schools. Paper presented to the AACTE, 1978.

Temp, G. Out-of-level works. Paper presented to the American Educational Research Association, 1979.